



IB MYP YEAR 5  
ASSESSMENT TASK  
**A Broad-based Test**

Subject:	Y10 <i>Standard</i> Mathematics	Name : (Class)	TASHA COSBERG (1) Y10 Peace
Assessment:	Broad-based Test		
Topics covered	Polynomials, Transformations (and transforming functions), Probability, Vectors, Matrices, Indices		
Date of assessment:	Thursday 16 <sup>th</sup> February 2012		

- This task assesses Criteria A and C;
- Time allowed – *one hour 40 minutes*;
- You must answer all the questions;
- Write your answers in the spaces provided;
- Show all of your working – not just the answer
- GDCs are allowed.

A 2  
C 3

Criterion A		
Levels	Task-Specific Rubric	Official IB Descriptors
0	The student does not reach a standard described by any of the descriptors given below.	
1-2	Students are reasonably successful with the Part A questions only. Any errors here are relatively minor.	The student <b>generally</b> makes appropriate deductions when solving <b>simple</b> problems in <b>familiar</b> contexts.
3-4	Students are successful with Part A questions. The only errors in part B questions are minor.	The student generally makes appropriate deductions when solving <b>more complex</b> problems in <b>familiar</b> contexts.
5-6	Students are successful with Part A and B questions. The only errors in part C questions are minor.	The student <b>generally</b> makes appropriate deductions when solving <b>challenging</b> problems in a <b>variety</b> of <b>familiar</b> contexts.
7-8	Students are successful with Part A, B and C questions. The only errors in part D questions are minor.	The student <b>consistently</b> makes appropriate deductions when solving <b>challenging</b> problems in a <b>variety</b> of contexts including <b>unfamiliar situations</b> .

Criterion C		
Levels	Task-Specific Rubric	Official IB Descriptors
0	The student does not reach a standard described by any of the descriptors given below.	
1-2	Very little working is shown, and/or the steps shown are confusing. Only the most basic mathematical symbols are used with accuracy.	The student shows <b>basic use</b> of mathematical language and/or forms of mathematical representation. The lines of reasoning are <b>difficult to follow</b> .
3-4	The working shown is generally adequate. Only a few errors in symbols/terminology are evident. It is reasonably easy to follow a student's logic/reasoning.	The student shows <b>sufficient use</b> of mathematical language and forms of mathematical representation. The lines of reasoning are <b>clear though not always logical or complete</b> . The student moves between different forms of representation with <b>some success</b> .
5-6	There are very few, if any, errors in symbols/terminology. All steps in calculations are shown in their completeness. It is easy to follow all the student's logic/reasoning.	The student shows <b>good use</b> of mathematical language and forms of mathematical representation. The lines of reasoning are <b>concise, logical and complete</b> . The student moves <b>effectively</b> between different forms of representation.

## Part A (Level 1-2 Questions)

**Q1.** Factorise *completely* the following expressions:

(a)  $x^2 - 16$

Answer (a) .....

(b)  $x^2 - 16x$

Answer (b) .....

(c)  $x^2 - 16x - 36$

$$\begin{array}{r} x \quad -12 \\ x \quad -4 \\ \hline -12x + -4x \end{array}$$

$12 \times 4 = 48$  !!

Answer (c)  $(x-12)(x-4)$  .....

**Q2.** Simplify the following expressions, giving your answers in the form  $a^n$ , where  $a$  and  $n$  are integers:

(a)  $3^5 \times 3^{-4}$

Answer (a)  $3^1$  .....

(b)  $2^4 \times 3^4$

Answer (b)  $6^4$  .....

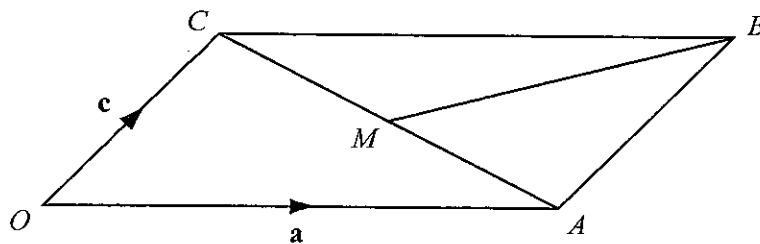
(c)  $(6^2)^3$

Answer (c)  $36^3$  .....

(d)  $16^2 \div 2^8$

Answer (d)  $8^4$  .....

Q3.



OACB is a parallelogram.  $\vec{OA} = \mathbf{a}$ ,  $\vec{OC} = \mathbf{c}$  and M is the midpoint of CA. Find, in terms of  $\mathbf{a}$  and  $\mathbf{c}$ :

(a)  $\vec{OB}$

$$\vec{OM} = \vec{MB}$$

$$\vec{MB} \times 2 = \vec{OB}$$

Answer (a)  $\vec{OB} = \vec{MB} + \vec{MB}$

(b)  $\vec{CA}$

$$\vec{CA} = \vec{CM} + \vec{MA}$$

$$\vec{OC} + \vec{OA} = \vec{CA}$$

Answer (b)  $\vec{OC} + \vec{OA} = \vec{CA}$

(c)  $\vec{BM}$

$$\triangle OCA = \triangle CBA$$

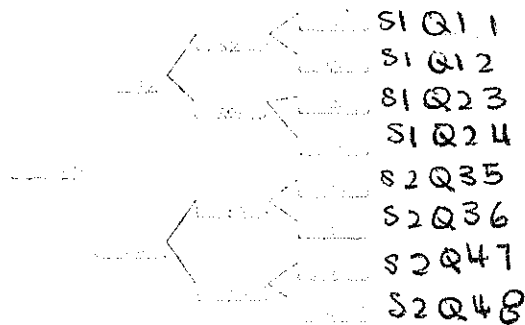
$$\triangle CBA \div 2 = \triangle CMB / MBA$$

$$\vec{MB} = \vec{OM}$$

Answer (c)  $\mathbf{c} + \mathbf{a} = \vec{CA} \therefore \vec{CA} \div 2 = \vec{CM}$   
 $\vec{CM} + \vec{CB} = \vec{MB}$

## Part B (Level 3-4 Questions)

**Q4.** Eight teams take part in a basketball tournament. Each team is equally likely to win any particular game. Winning teams advance to the next stage. The losers go home!!



**(a)** Find the probability that all the even numbered team reach the quarter-finals (Q1, Q2, Q3, Q4).

2, 4, 6, 8

Answer (a) .....

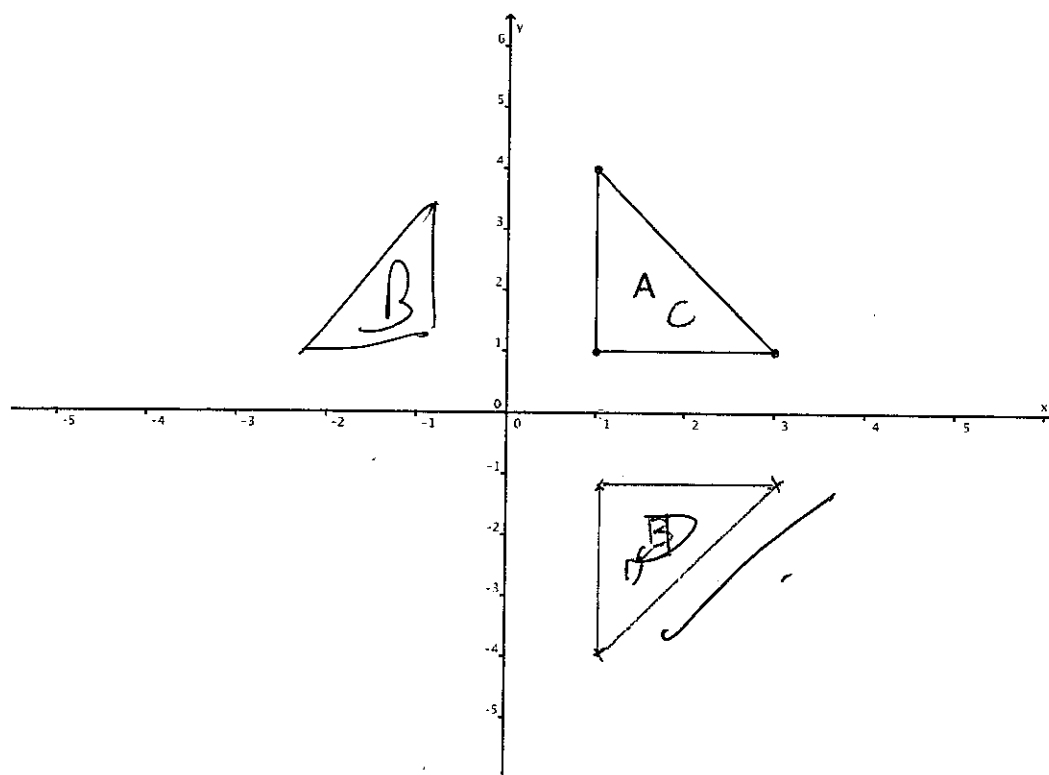
$\frac{4}{8} = \frac{1}{2}$

**(b)** Find the probability that team 1 will play team 8 in the final.

Answer (b) .....

$\frac{1}{8}$

**Q5.** Triangle A is plotted on the Cartesian plane below.



$C = ??$

- (a) On the same Cartesian plane above, draw the following:
- (i) Triangle A after it is translated by a translation vector  $\begin{pmatrix} -4 \\ 1 \end{pmatrix}$ , label it B.
  - (ii) Triangle C is the reflection of triangle B in the x-axis, draw triangle C.
  - (iii) Triangle D is the reflection of triangle A in the x-axis, draw triangle D.
- (b) Describe the single transformation, which maps triangle C onto triangle D.

Answer ...the x-axis  $\oplus$  ??

**Q6.** Erik runs a race at an average speed of  $x$  m/s.

His time is  $(3x - 9)$  seconds and the race distance is  $(2x^2 - 8)$  metres.

(a) Write down an equation in  $x$  and show that it simplifies to

$$x^2 - 9x + 8 = 0$$

$\rightarrow$

$<$

(b) Solve  $x^2 - 9x + 8 = 0$

$$(x-8)(x-1)$$

$$x-8=0 \text{ or } x-1=0$$

$$x=8 \text{ or } x=1$$

Answer (b)  $x=8$  or  $x=1$

(c) Write down Erik's time and the race distance.

$$(2x^2 - 8)(3x - 9)$$

$$= 6x^2 - 18x^2 - 24x + 72$$

$$= 6(x^2 - 6x^2 - 18x + 66)$$

$$= 6(7x^2 - 18x + 66)$$

Answer (c)  $6(7x^2 - 18x + 66)$

### Part C (Level 5-6 Questions)

Q7. Solve the following equation for x:

$$2^{x+3} + 2^x = 36$$

$$x+3+x=36$$

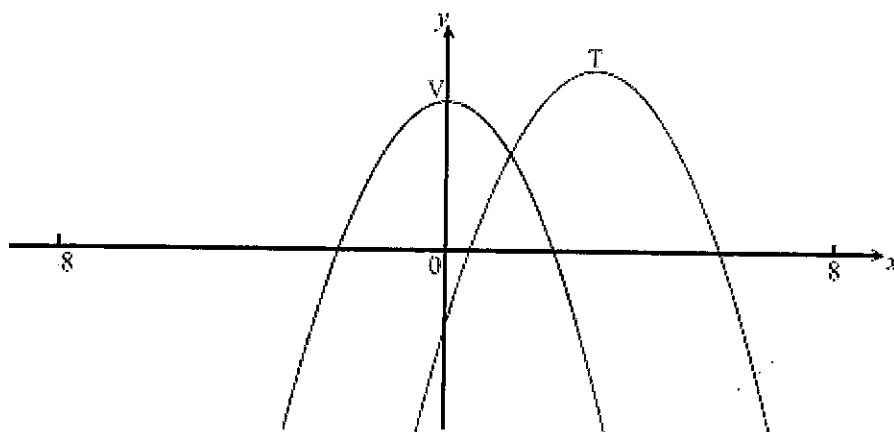
$$2x = 33$$

$$x = 16.5$$

Answer  $x=16.5$

**Q8.** The following diagram shows part of the graph of  $f(x) = 5 - x^2$  with vertex  $V(0, 5)$ .

Its image  $y = g(x)$  after a translation with vector  $\begin{pmatrix} h \\ k \end{pmatrix}$  has vertex  $T(3, 6)$ .



**(a)** What are the value of  $h$  and  $k$ ?

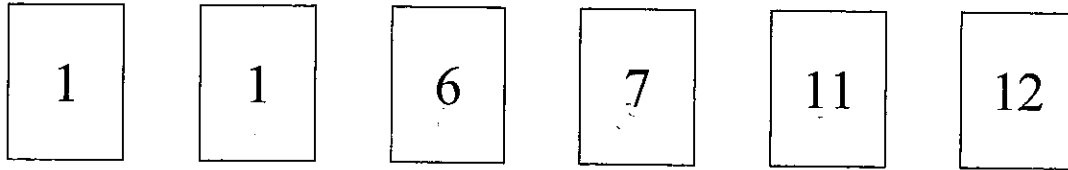
Answer (a) .....

**(b)** Write down an expression for  $g(x)$ .

Answer (b) .....

**(c)** On the same diagram, sketch the graph of  $y = g(-x)$ .

Q9.

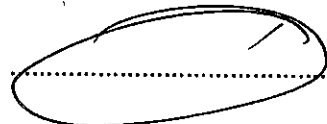


Six cards are numbered 1, 1, 6, 7, 11 and 12 as shown.

Cards are chosen, without replacement, until a card numbered 1 is chosen.

Find the probability this happened **before** the fourth card is chose.

$$\begin{aligned}
 & \left(\frac{1}{4} \times \frac{1}{4} \times \frac{0}{4} \times \frac{0}{4}\right) + \left(\frac{0}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{0}{4}\right) + \left(\frac{0}{4} \times \frac{0}{4} \times \frac{1}{4} \times \frac{1}{4}\right) + \left(\frac{1}{4} \times \frac{0}{4} \times \frac{1}{4} \times \frac{0}{4}\right) \\
 & + \left(\frac{0}{4} \times \frac{1}{4} \times \frac{0}{4} \times \frac{0}{4}\right) + \left(\frac{0}{4} \times \frac{0}{4} \times \frac{1}{4} \times \frac{0}{4}\right) + \left(\frac{0}{4} \times \frac{0}{4} \times \frac{0}{4} \times \frac{1}{4}\right) + \left(\frac{1}{4} \times \frac{0}{4} \times \frac{0}{4} \times \frac{1}{4}\right) \\
 & + \left(\frac{0}{4} \times \frac{1}{4} \times \frac{0}{4} \times \frac{1}{4}\right) + \left(\frac{1}{4} \times \frac{0}{4} \times \frac{1}{4} \times \frac{0}{4}\right) \\
 & = \frac{1}{256} + \frac{1}{256} + \frac{1}{256} + \frac{1}{256} + \frac{1}{256} + \frac{1}{256} \\
 & = \frac{6}{1536} \\
 & = \frac{1}{256}
 \end{aligned}$$

Answer 

### Part D (Level 7-8 Questions)

**Q10.** Luis deposits a large sum of money in a bank account that pays 0.6% interest, compounded monthly. How long does it take Luis's money to grow by 10%?

Answer 



- Q11.** A cubical die is biased, so that some faces are more likely to show than others.  
The following table summarises the situation:

Score	1	2	3	4	5	6
Probability	$p^2$	$p^2$	$p$	$p/2$	0.03	0.05

(a) Find the value of  $p$

2.25    2.25    0.03    1.5

*Working?*

Answer (a) .....

0.03

(b) What is the most likely score when you roll this biased die?

Answer (b) .....

1 or 2

(c) If you roll the die twice and add the scores, what is the probability the total is at least 10?

Answer (c) .....

$\frac{2}{6} = \frac{1}{3}$

**NOW GO BACK AND CHECK YOUR WORK**

